

Rejection over Langlet I in view of Latypov

The Examiner has now rejected claims 1, 18, 23, 28, and 33-34 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Langlet I in view of Latypov, et al., WO 99/46202 ("Latypov"). The Examiner has asserted that:

"It would have been obvious to one of ordinary skill in the art at [the] time of [the] invention to have used a guanylurea ion in the method of Langlet I, motivated by the fact that [Latypov] recognize that guanidine and guanylurea are chemical equivalents to make dinitramide salts and so the skilled artisan would have used guanylurea in place of guanidine in the method of Langlet I to produce guanylurea dinitramide for its desirable properties as an explosive, and as a component in propellants, explosives and pyrotechnical compositions."

(Office Action, p. 3). Applicants respectfully traverse.

As discussed in Applicants' previous amendments, Langlet I discloses a process for producing a salt of dinitramidic acid. The process starts with an initial reaction mixture with a very low pH, which includes a nitrating acid to form dinitramidic acid (col. 1, lines 52-66). This is the same starting reaction mixture as is used in the presently claimed process.

The dinitramidic acid formed in the first step of Langlet I's process is not stable in the acidic environment and

the reaction mixture must be neutralized by the addition of a neutralizing agent to the reaction mixture (see, col. 2, lines 21-23, and, col. 1, lines 46-51). The neutralizing agent is added to interrupt the nitration process at an optimal point (col. 2, lines 23-25). By contrast, in the presently claimed process only guanyluarea is added - without a neutralizing agent - and the final product is directly precipitated from an acidic reaction mixture.

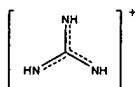
Thus, if a person of ordinary skill were looking at the process of Langlet I and seeking a neutralizing agent, he or she would not select guanyluarea (which is what is needed to arrive at the present invention). As discussed in the last amendment, the reaction mixture of Langlet I is very acidic, with the pH of such a mixture being at or below 0. A person of skill in the art would choose a very strong base to neutralize such a reaction mixture,. However, the guanyluarea ion is not a base but instead acts as a weak acid. Therefore, adding guanyluarea or a protonated form thereof to the reaction mixture could not possibly raise the pH of the solution in Langlet I to 7 (or even 7 ± 1), even if added in enormous amounts. Thus, a person of ordinary skill in the art simply would not have thought to use

guanylurea in Langlet I's process, regardless of the teachings of Latypov (or other prior art references).

Latypov describes a process for preparing organic dinitramide salts by reaction in an aqueous solution (p. 2, lines 8-15). Latypov's reaction mixtures are entirely different from the highly aggressive, nitrating acid mixtures of Langlet I, so that a person of skill in the art would not expect to be able to transfer information from Latypov's process to Langlet I's process.

Furthermore, Langlet I proposes guanidium¹ as a possible neutralizing agent (col. 3, lines 21-22). Both guanadine and guanidium (the cationic form of guanidine) form complex slurries of dissolved salts in the Langlet I reaction mixture, which need further processing in order to extract a solid salt. Latypov teaches that guanidine carbonate and guanylurea carbonate behave similarly in making organic dinitramide salts according to Latypov's process (p. 2, line 35 - p. 3, line 2). Thus, a person of skill in the art would have had no reason to try to use guanylurea in Langlet I's process, since

¹Guanidium is the cationic form of guanidine and has the following structure:



the result would not be expected to be different from what is achieved with guanidine or its protonated form, guanidium.

It was surprising, in fact, that guanylurea provides the unusual and useful results that it does (i.e. producing a solid, easily separable precipitate from an acidic mixture). This fact alone required withdrawal of the obviousness rejection.

In summary, when guanidium is added to the reaction mixture of Langlet I, it does not result in the precipitation of a stable salt (as is the case when guanylurea is added). Moreover, if a person of skill in the art used guanidine instead of guanidium - he or she would achieve essentially the same unsatisfactory result. Thus, the person of skill in the art looking at Latypov would not be enticed into trying guanylurea, since (1) Latypov teaches (erroneously) that guanylurea and guanidine are equivalent for the purposes of making dinitramide salts, and (2) Langlet I teaches that guanidine provides unsatisfactory results.

In view of the foregoing, Applicants respectfully submit that the Examiner's rejection of the claims over Langlet I in view of Latypov can only be made with the benefit of hindsight. The rejection, therefore, should be reconsidered and withdrawn.

Rejection over Langlet I in view of Latypov and Seyerl

The Examiner has rejected claims 16-17, 19-22, 24-27, and 29-32 under 35 U.S.C. § 103(a) as allegedly unpatentable over Langlet I in view of Latypov and Seyerl, U.S. Patent No. 4,559,409 ("Seyerl"). These claims specifically recite the use of cyanoguanidine in the process of the present invention.

First, for the reasons outline above, the process of the present application would not have been obvious over Langlet I in view of Latypov. Nothing in Seyerl remedies these deficiencies. In particular, cyanoguanidine could not function as a neutralizing agent for the very strongly acidic initial reaction mixture of Langlet I. Thus, a person of skill in the art would not seek to use cyanoguanidine in Langlet I's process.

Second, there are additional reasons why a person of skill in the art would not seek to combine the teachings of Seyerl with those of Langlet I. For example, the acid used by Seyerl - sulfaminic acid - is of only moderate acidity, while the nitrating mixture of Langlet I is highly acidic. Since the reaction mixtures of Langlet I and Seyerl are so different, a person of skill in the art would not seek to use Seyerl's cyanoguanidine in Langlet I's process.

Similarly, Seyerl teaches that the cyanoguanidine should be reacted with sulfaminic acid at a temperature of 70°-105°C (Abstract), while Langlet I prefers a temperature below -25°C (col. 2, lines 15-16). This stark difference again would counsel a person of skill the art against combining the teachings of the references.

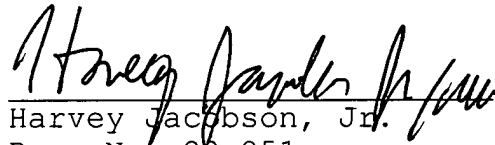
In view of the foregoing, Applicants respectfully submit that the rejection over Langlet I in view of Latypov and Seyerl should be reconsidered and withdrawn.

Conclusion

In view of the foregoing remarks, it is believed that the claims are now in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided below.

Respectfully submitted,

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